DSA250i Specifications

Features

- 2-Way, full-range loudspeaker for voice and music applications
- Vertical coverage pattern adjustable to fit the audience area
- Integral signal processing and amplification
- Built-in electronic driver protection
- Wall Mounting hardware included

Description

The DSA250i is a unique, column-type loudspeaker for full-range FGM (foreground music) and voice applications. It also functions with additional DSA Series loudspeakers to provide increased performance. For example, a DSA250i used with the DSA230 extends directivity to and increases the output at lower frequencies.

The DSA250i has the remarkable versatility of a user-adjustable, vertical beamwidth. This is made possible because each transducer has its own DSP (digital signal processing) and power amplifier. Built-in networking provides for remote PC operation and control. Intended to be flat-mounted to a wall, the user directs the DSA250i's output from this position to the desired coverage area using the supplied DSAPilot software. Pattern asymmetry provides similar sound levels to both near and far listeners. Each of the two inputs has user-adjustable EQ, delay, and compression.

DSA loudspeakers are engineered as a solution for applications with difficult acoustics, physical mounting limitations, precise vertical coverage requirements, and difficult aesthetic requirements. They can replace typical horn/woofer or column-type loudspeakers in small to medium venues. These include houses of worship, auditoriums, theaters, concert halls, conference rooms, transportation centers, athletic facilities, classrooms, museums, shopping malls, and theme parks. The enclosure profile and appearance reduces architectural impact.

Warranty: five years loudspeaker components; two years electronics.

2-WAY FULL-RANGE DIGITALLY STEERABLE ARRAY

See TABULAR DATA notes for details

CONFIGURATION

Subsystem

	Transducer	*Loading*
LF	8x 4 in cone	Direct radiating
HF	8x 1 in dome	Horn loaded

Operating Mode

	Amplifier Channels	*External Signal Proc.*
Self-powered	16x high efficiency	None

ACOUSTICAL PERFORMANCE

Operating Range	78 Hz to15 kHz	
Nominal Beawidth	Horz	120°
	Vert	Digitally variable

ELECTRONIC PERFORMANCE

Analog

Amplifier Output (ea)	28.3 V	50 W @ 16 ohm
Input (Audio A and B):		
Configuration	Balanced differential	
Nominal Sensitivity	0.9 V / 1.25 dBu	For full output
Maximum Signal	12.2 V / 24 dBu	
Input Routing	A + B, A or B, priority B over A	

Digital

A to D/ D to A	48 kHz, 24 bit
Processor	32 bit dual SHARC (Super Harvard Architecture Computer)
Propagation Time	4.3 ms

INPUT SIGNAL PROCESSING

Filters

	Frequency	*Boost/Cut*	*Q*
Parametric	10 to 24000 Hz	+15/-15 dB	0.25 to 64
6 or 12 dB Lo Shelf	10 to 24000 Hz	+15/-15 dB	
6 or 12 dB Hi Shelf	10 to 24000 Hz	+15/-15 dB	
HPF and LPF	10 to 24000 Hz	12/18/24 dB/oct	L-R, BW, Bessel

Compression

Threshold	-40 to +24 dBu
Ratio	1.2:1 to inf:1
Attack (ms)	slow (64) / med (16) / fast (2)
Release (ms)	slow (256) / med (64) / fast (8)

Gain	-60 dB to +10 dB
Mute	on/off
Signal Delay	300 ms maximum

Meters

Input	-40 to +20 dBu	
Output	-30 to 0 dB	ref 0 dB = full output
Gain Reduction	0 dB to -60 dB (compression)	

CONNECTIONS

Computer Network

Standard	EIA-485
Optional	CobraNet (requires EAW CM-1 Interface Card accessory)
Fault Supervision	Form C dry contact relay

AC Mains

	Voltage / Frequency	*Maximum Current*
DSA250i (115 V)	100 to 120 V / 50 to 60 Hz	4 A
DSA250i (230 V)	220 to 240 V / 50 to 60 Hz	4 A

ORDERING DATA

Description	*Part Number*
DSA250i White 115 V	0015158-00
DSA250i White 230 V	0015158-01
Optional Accessories	
CM-1 CobraNet Interface Card	0005987
DSA Fly-Bar Kit	0007445
DSA Enclosure Connecting Kit	0007446

COMPLIANCES

FC Part 15 CE EN 60065:2002, EN 55103-1:1997, EN 55103-2:1997, EN55103-1, EN55103-2, EN60065 ETL C US

S3 SYSTEM SPECIFICATION STANDARD

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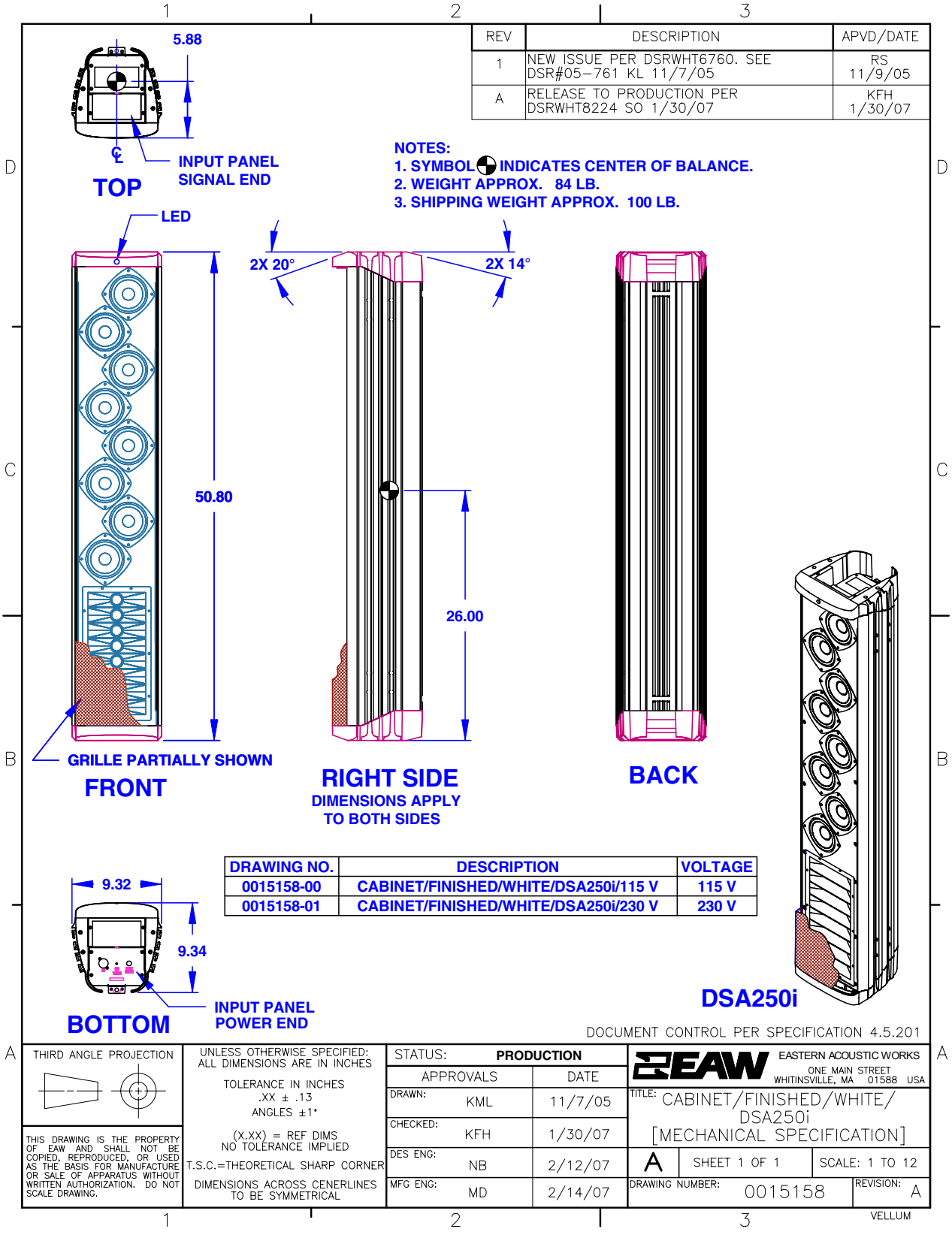
ENCLOSURE

Material	Rear: extruded aluminum, Front baffle: PVC
Finish	Powder-coated white
Grille	Powder-coated perforated steel

REV	DESCRIPTION	APVD/DATE
1	NEW ISSUE PER DSRWHT6760. SEE DSR#05-761 KL 11/7/05	RS 11/9/05
A	RELEASE TO PRODUCTION PER DSRWHT8224 SO 1/30/07	KFH 1/30/07



DRAWING NO.	DESCRIPTION	VOLTAGE
0015158-00	CABINET/FINISHED/WHITE/DSA250i/115 V	115 V
0015158-01	CABINET/FINISHED/WHITE/DSA250i/230 V	230 V

DOCUMENT CONTROL PER SPECIFICATION 4.5.201

THIRD ANGLE PROJECTION

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UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN INCHES

TOLERANCE IN INCHES
.XX ± .13
ANGLES ±1°

(X.XX) = REF DIMS
NO TOLERANCE IMPLIED

T.S.C.=THEORETICAL SHARP CORNER

DIMENSIONS ACROSS CENERLINES TO BE SYMMETRICAL

STATUS: PRODUCTION

APPROVALS		DATE
DRAWN:	KML	11/7/05
CHECKED:	KFH	1/30/07
DES ENG:	NB	2/12/07
MFG ENG:	MD	2/14/07

EASTERN ACOUSTIC WORKS
ONE MAIN STREET
WHITINSVILLE, MA 01588 USA

TITLE: CABINET/FINISHED/WHITE/DSA250i [MECHANICAL SPECIFICATION]

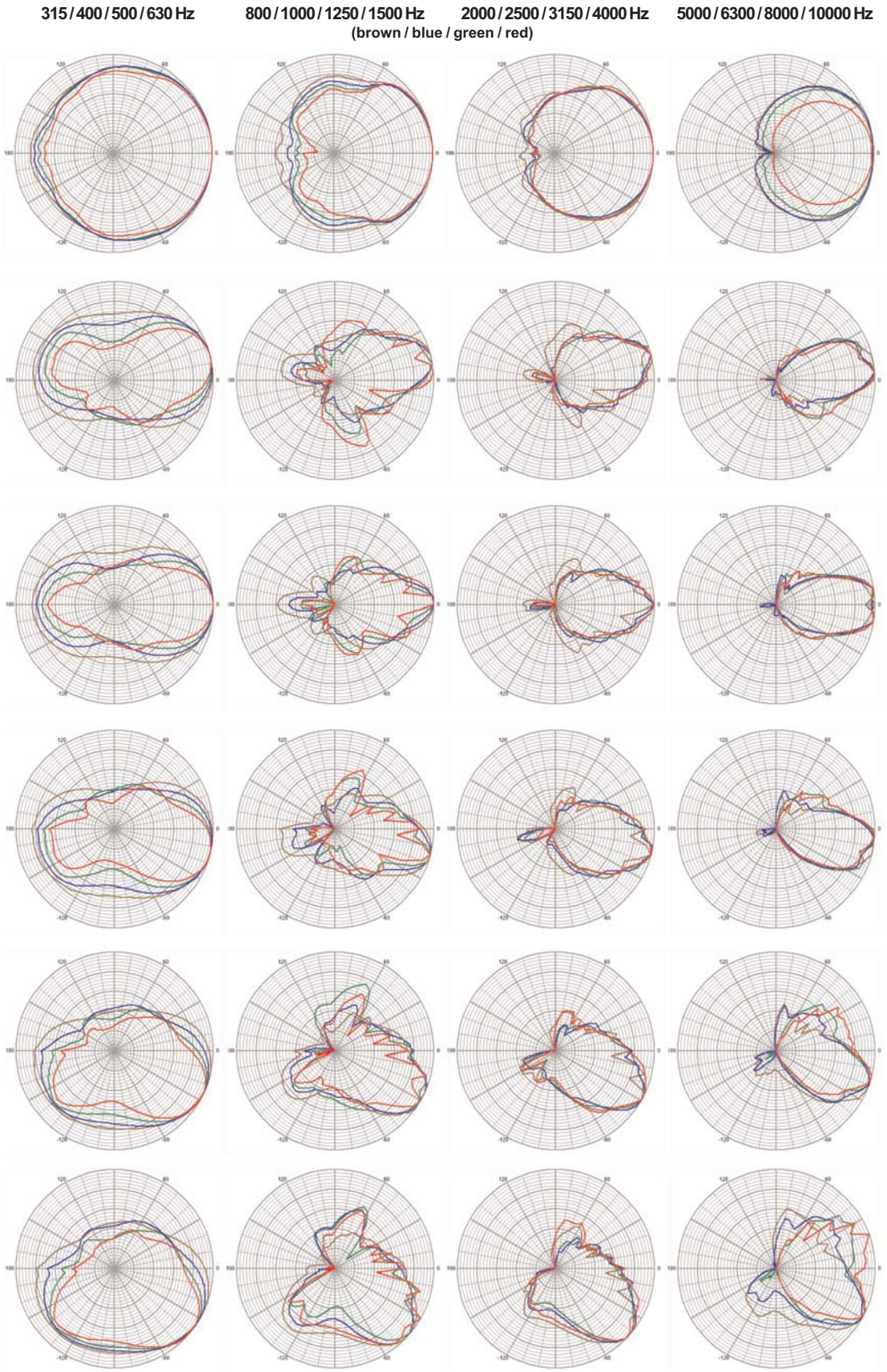
A | SHEET 1 OF 1 | SCALE: 1 TO 12

DRAWING NUMBER: 0015158 | REVISION: A

VELLUM

NOTE: This drawing has been reduced. Do not scale.

DSA250 1/3 OCTAVE POLAR RESPONSES: 40° Vertical Beamwidth



Referenced to 20 m, 1/3 octave smoothing, 5° resolution, 1 dB / division

NOTE: The DSA250i's acoustical performance varies with the steering and beamwidth settings as well as whether it is used singly or in clusters with other DSAi loudspeakers. The above graphs are only an example of the wide range of steering possibilities.

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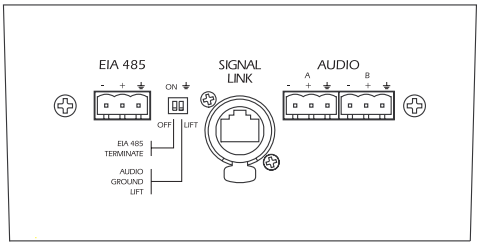
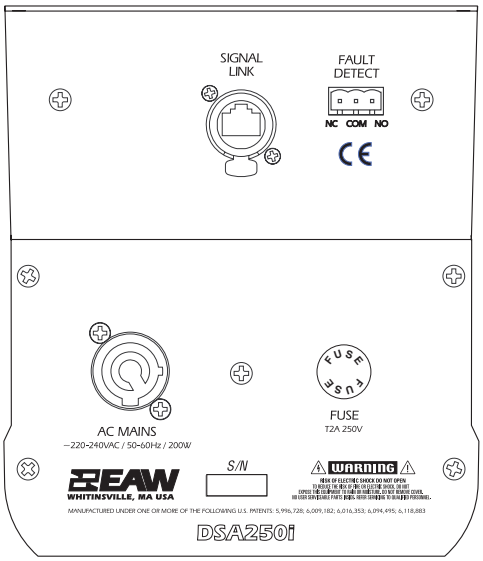
DSA250i Specifications

INPUT PANEL

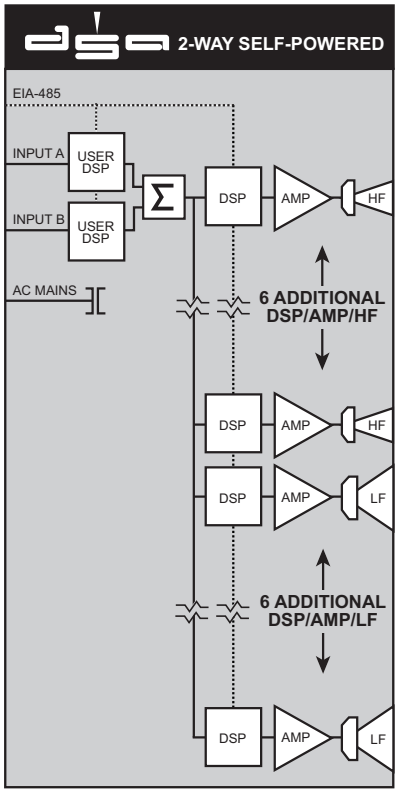
SIGNAL END



POWER END



SIGNAL DIAGRAM



LEGEND

DSP: Digital Signal Processing for EQ, limiting, and delay.
LF/MF/HF: Low Frequency / Mid Frequency / High Frequency.
PWR AMP: Power Amplifier.
Σ: Summing Amplifier

NOTES

TABULAR DATA

1. **Measurement/Data Processing Systems:** Primary - FChart: proprietary EAW software; Secondary - Brüel & Kjær 2012.
2. **Microphone Systems:** Earthworks M30; Brüel & Kjær 4133
3. **Measurements:** Dual channel FFT; length: 32 768 samples; sample rate: 48 kHz; logarithmic sine wave sweep.
4. **Measurement System Qualification** (includes all uncertainties)**:** SPL: accuracy +/-0.2 dB @ 1 kHz, precision +/-0.5 dB 20 Hz to 20 kHz, resolution 0.05 dB; Frequency: accuracy +/-1 %, precision +/-0.1 Hz, resolution the larger of 1.5 Hz or 1/48 octave; Time: accuracy +/-10.4 µs, precision +/-0.5 µs, resolution 10.4 µs; Angular: accuracy +/-1°, precision +/-0.5°, resolution 0.5°.
5. **Environment:** Measurements time-widowed and processed to eliminate room effects, approximating an anechoic environment. Data processed as anechoic or fractional space, as noted.
6. **Measurement Distance:** 7.46 m. Acoustic responses represent complex summation of the subsystems at 20 m. SPL is referenced to other distances using the Inverse Square Law.
7. **Enclosure Orientation:** For beamwidth and polar specifications, as shown in Mechanical Specification drawing.
8. **Volts:** Measured rms value of the test signal.
9. **Watts:** Per audio industry practice, "loudspeaker watts" are calculated as voltage squared divided by rated nominal impedance. Thus, these are not True Watt units of energy as defined by International Standard.
10. **SPL:** (Sound Pressure Level) Equivalent to the average level of a signal referenced to 0 dB SPL = 20 microPascals.
11. **Subsystem:** This lists the transducer(s) and their acoustic loading for each passband. Sub = Subwoofer, LF = Low Frequency, MF = Mid Frequency, HF = High Frequency.
12. **Operating Mode:** User selectable configurations. Between system elements, a comma (,) = separate amplifier channels; a slash (/) = single amplifier channel. DSP = Digital Signal Processor. IMPORTANT: To achieve the specified performance, the listed external signal processing must be used with EAW-provided settings.
13. **Operating Range:** Range where the processed Frequency Response stays within -10 dB SPL of the power averaged SPL within this range; measured on the geometric axis. Narrow band dips are excepted.
14. **Nominal Beamwidth:** Design angle for the -6 dB SPL points, referenced to 0 dB SPL as the highest level.
15. **Axial Sensitivity:** Power averaged SPL over the Operating Range with an input voltage that would produce 1 W at the nominal impedance; measured with no external processing on the geometric axis, referenced to 1 m.
16. **Nominal Impedance:** Selected 4, 8, or 16 ohm resistance such that the minimum impedance point is no more than 20% below this resistance over the Operating Range.
17. **Accelerated Life Test:** Maximum test input voltage applied with an EIA-426B defined spectrum; measured with recommended signal processing and Recommended Protection Filter.
18. **Calculated Axial Output Limit:** Highest average and peak SPLs possible during the Accelerated Life Test. The Peak SPL represents the 2:1 (6 dB) crest factor of the Life Test signal.
19. **High Pass Filter:** This helps protect the loudspeaker from excessive input signal levels at frequencies below the Operating Range.

GRAPHIC DATA

1. **Resolution:** To remove insignificant fine details, 1/12 octave cepstral smoothing was applied to acoustic frequency responses and 1/3 octave cepstral smoothing was applied to the beamwidth and impedance data. Other graphs are plotted using raw data.
2. **Frequency Responses:** Variation in acoustic output level with frequency for a constant input signal. Processed: normalized to 0 dB SPL. Unprocessed inputs: 2 V (4 ohm nominal impedance), 2.83 V (8 ohm nominal impedance), or 4 V (16 ohm nominal impedance) referenced to a distance of 1 m.
3. **Processor Response:** The variation in output level with frequency for a constant input signal of 0.775 V = 0 dB reference.
4. **Beamwidth:** Average angle for each 1/3 octave frequency band where, starting from the rear of the loudspeaker, the output first reaches -6 dB SPL referenced to 0 dB SPL as the highest level. This method means the output may drop below -6 dB SPL within the beamwidth angle.
5. **Impedance:** Variation in impedance magnitude, in ohms, with frequency without regard to voltage/current phase. This means the impedance values may not be used to calculate True Watts (see 9 above).
6. **Polar Data:** Horizontal and vertical polar responses for each 1/3 octave frequency band 100 Hz to 16 kHz or Operating Range.

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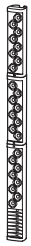
DSA250i Specifications

DSA SERIES PERFORMANCE MATRIX



Cluster	DSA230	DSA250i	DSA230 / DSA250i	DSA230 / DSA230 / DSA250i
Height (in/mm)	36.5/927	50.8/1290	87.6/2224	124.3/3158
Width (in/mm)	9.3/237	9.3/237	9.3/237	9.3/237
Depth (in/mm)	9.3/237	9.3/237	9.3/237	9.3/237
Weight (in/mm)	62/28.1	84/38.1	146/66.2	208/94.3
Nominal Horizontal Beamwidth	120	120	120	120
Beamwidth Range	800 Hz to 4.5 kHz	800 Hz to 10 kHz	800 Hz to 10 kHz	800 Hz to 10 kHz
20° NOMINAL VERTICAL BEAMWIDTH				
Beamwidth Range	1 kHz to 8 kHz	1 kHz to 15 kHz	400 Hz to 15 kHz	270 Hz to 15 kHz
Frequency Range (+/- 3 dB tolerance)	90 Hz to 6.5 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz
Operating Range (-10 dB frequencies)	78 Hz to 10 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz
SPL Limit (avg)	116.0	117.2	123.4	126.5
SPL Limit (peak)	122.0	123.2	129.4	132.5
40° NOMINAL VERTICAL BEAMWIDTH				
Beamwidth Range	500 Hz to 10 kHz	500 Hz to 15 kHz	200 Hz to 15 kHz	130 Hz to 15 kHz
Frequency Range (+/- 3 dB tolerance)	90 Hz to 6.5 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz
Operating Range (-10 dB frequencies)	78 Hz to 10 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz
SPL Limit (avg)	115.6	116.2	121.7	124.1
SPL Limit (peak)	121.6	122.2	127.7	130.1
60° NOMINAL VERTICAL BEAMWIDTH				
Beamwidth Range	300 Hz to 10 kHz	300 Hz to 15 kHz	135 Hz to 10 kHz	90 Hz to 10 kHz
Frequency Range (+/- 3 dB tolerance)	90 Hz to 8.2 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz
Operating Range (-10 dB frequencies)	78 Hz to 10 kHz	78 Hz 15 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz
SPL Limit (avg)	114.2	115.5	119.9	120.8
SPL Limit (peak)	120.2	121.1	125.9	126.8
80° NOMINAL VERTICAL BEAMWIDTH				
Beamwidth Range	225 Hz to 5.5 kHz	225 Hz to 10 kHz	110 Hz to 10 kHz	80 Hz to 10 kHz
Frequency Range (+/- 3 dB tolerance)	90 Hz to 8.2 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz	90 Hz to 13 kHz
Operating Range (-10 dB frequencies)	78 Hz to 10 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz	78 Hz to 15 kHz
SPL Limit (avg)	113.1	114.1	118.3	119.7
SPL Limit (peak)	119.1	120.1	124.3	125.7

NOTES

1. Beamwidth and Frequency data is referenced to 20 m on axis, including air losses; steering at 0 degrees.
2. Beamwith Range is where the pattern widens to more than 1.5 times nominal below the low frequency and narrows to less than 0.67 times nominal above the high frequency.
3. Avg SPL Limits are referenced to 1 m at an output equivalent to 0.5 times rated amplifier power at nominal impedance.
4. Peak SPL Limits are reference to 1 m at an output equivalent to maximum peak amplifier power at nominal impedance.

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